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number four. Why not seven, or three, or none, does not clearly appear from his argument. But from so candid a preface one is led to expect much, and it is quite likely that Signor Bruchi will find a much larger circle of readers than his gloom has anticipated. μκρκ.

LES PRINCIPES DE LA MÉCANIQUE RATIONELLE. Par *C. de Freycinet*, de l'Institut.
Paris: Gauthier-Villars, Imprimeur-Libraire. 1902. Pp., viii, 167.

In his customary clear and simple style M. C. de Freycinet of the Institute of France has here endeavored to give to the world a study of the principles of rational mechanics which shall restore that science to its ancient dignity. The prevailing spirit of treating the principles of mechanics is an entirely abstract one. Real physical bodies are neglected and systems are constructed in which mass and force play the part of mere algebraic entities: postulates and axioms are propounded, and the movements are sought which these systems are constrained to take conformably to the initial hypotheses. As an eminent geometer has said: "The dualism between force and matter which crept into the ancient mechanics is by this expedient avoided."

Now, in M. de Freycinet's opinion, the new ways of procedure are not absolutely trustworthy, and are certainly not favorable to the discovery of new laws. He believes it wise to hold to the traditions of Galileo and Newton, D'Alembert, Laplace, and Lagrange, and if there is any change to be made in the methods hitherto reputed classical it is preferable to emphasise even more strongly the experimental character of the principles and to throw still more prominently into relief the *physical* data on which they rest. Unquestionably mechanics as thus set forth is a "mixture" of mathematics and observation, tintured "with some ingredients of anthropomorphism." But what branch of human knowledge, asks M. de Freycinet, can escape a similar censure? Does not every science bear the imprint of our intellectual concepts, and outside the domain of pure logic the imprint also of our sensations of the external world? The fecundity and certitude of a science ought, on the contrary, to be in direct proportion to the intimacy of its contact with nature. M. de Freycinet has accordingly endeavored to strike out again on the roads which the present generation appears to be abandoning. Instead of endeavoring to extenuate in any way the supposititious deficiencies above signalised, he has deliberately augmented them by giving more and more place to empirical considerations. The mixture of observation with mathematics above referred to as indicating a lack of unity will here be rendered still more apparent, though with the distinct hope that the supposed confusion will be lessened. According to M. de Freycinet, the experimental data are the beginning and the reason of the analytical theories; they invest them with that reality without which the most brilliant achievements of analysis are futile.

The book is within the mental reach of any one who possesses an elementary knowledge of mechanics.